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Online or in Person? Examining College Decisions to Reopen during the COVID-19 Pandemic in Fall 2020

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Abstract

When coronavirus disease 2019 (COVID-19) became a major impediment to face-to-face college instruction in spring 2020, most teaching went online. Over the summer, colleges had to make difficult decisions about whether to return to in-person instruction. Although opening campuses could pose a major health risk, keeping instruction online could dissuade students from enrolling. Taking an ecological approach, the authors use mixed modeling techniques and data from 87 percent of two- and four-year public and four-year private U.S. colleges to assess the factors that shaped decisions about fall 2020 instructional modality. Most notably, the authors find that reopening decisions about whether to return to in-person instruction were unrelated to cumulative COVID-19 infection and mortality rates. Politics and budget concerns played the most important roles. Colleges that derived more of their revenue from tuition were more likely to return to classroom instruction, as were institutions in states and counties that supported Donald Trump for president in 2016.

Keywords

education, COVID, policy, politics, contextual effects

Beginning in March 2020, the coronavirus (COVID-19) pandemic became a major impediment to face-to-face businesses. The virus was spreading rapidly, and state governments began issuing stay-at-home orders to workers deemed nonessential (Mervosh, Lu, and Swales 2020). Colleges across the country transitioned from in-person to online instruction, resulting in many students returning to their parents' homes to complete their spring semester online (Marsicano et al. forthcoming). Gradually, COVID-19 infections and deaths began to decline. As summer began, service and sales establishments had reopened in 31 states. Summer gatherings resulted in a COVID-19 infection surge in many parts of the country that had not previously been affected (Foster and Mundell 2020). This latter surge was apparently concentrated among younger people and thus resulted in less serious illness and fewer deaths (Colson 2020).

In deciding whether to resume in-person classes, college administrators faced significant cross-pressures. On the one hand, colleges faced financial and political pressure to reopen. Administrators at many schools could expect steep enrollment declines if they kept instruction online, as distance learning is generally perceived by students as a poor substitute for in-person learning. Politically, President Trump and his supporters were especially vocal in their support of colleges' fully reopening (Bauer-Wolf 2020). On the other hand, colleges faced pressure from many faculty members and some health officials to remain online. Of particular concern was that the traditional college-age population was being infected at higher rates and would not be as likely to heed public health warnings about social distancing and mask wearing (Cleveland Clinic 2020; Wan and Balingit 2020). Confronted with conflicting pressures, many administrators waited until late in the summer to make decisions regarding in-person instruction.

Drawing on a sample comprising 87 percent of America's nonspecialized two- and four-year public and private

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colleges,[1] we assess the factors that shaped official reopening decisions as of October 22, 2020. Using multilevel modeling techniques, we consider the influence of more than two dozen factors at the state, county, and institutional levels. Although there are nuances in the conclusions we discuss below, the bottom line is that reopening decisions were driven largely by state and county politics and budgetary concerns, not by local COVID-19 infection or fatality rates.

University Decision Making

To understand college administrators' decisions, we draw on a Weberian perspective of bureaucracy and rationality (Waters and Waters 2015; Weber [1921] 1978). Within this framework, decision making is viewed as grounded within a process of bounded rationality (Simon 1990). For college administrators the decision-making process entails choosing from among alternatives to achieve a certain result (Eisenfuhr 2011). In deciding to reopen in-person instruction, college executives had to consider whether it was feasible, what the alternatives might be, and what impact it would have (Grant 2011). Many people would be influenced by the decision to reopen, including the campus community and nearby residents. Additionally, many college administrators' decisions had to be made jointly with leaders at the system and state levels. Finally, administrators had to make virtually unprecedented judgements within complex economic, political, health, and cultural environments with limited knowledge. As we investigate the factors affecting reopening, we use an ecological approach (Duncan, Schnore, and Rossi 1959) that considers not only the characteristics of colleges but also the dynamics operating in the geographical context as well as system-level influences. As we explain in the next section, we anticipate that the norms, political preferences, laws, and experiences with COVID-19 in the surrounding area would have played a role in the decision to reopen.[2]

Local Area Characteristics

Political Partisanship

One of the most important factors that could have shaped in-person instruction is county and state support for Trump in the 2016 presidential election. Beginning in summer 2020, President Trump began encouraging schools of all kinds to resume in-person instruction in the fall (Bauer-Wolf 2020). He chose to support the requirement that international students could not take more than one online course each term, which would have forced international students at colleges with all online instruction to leave the country (Schwartz 2020). Several other political leaders followed Trump's lead in minimizing the extent of the pandemic and its detrimental consequences and encouraging businesses to reopen (Olorunnipa, Witte, and Bernstein 2020).

Part of college administrators' job is to look after the political and economic interests of their institutions, and those interests vary at the state and local levels. Thus, we would expect that support for Trump within counties and states would influence reopening decisions. As the proportion of residents who voted for Trump in the 2016 election in either states or counties increased, norms and policies should be more likely to reflect pro-Trump sentiments, exerting pressure on colleges to provide in-person instruction.

Figure 1 presents a map of the United States shaded according to 2016 presidential election results, with dots representing the three largest colleges by undergraduate enrollment in each state. Shades of blue indicate majority support for Hillary Clinton, while shades of red indicate majority support for Trump. The darker the shade, the greater the skew toward the candidate. The three largest colleges in each state are represented with purple diamonds and green dots, the former indicating schools that were primarily or fully online and the latter indicating colleges that returned to some in-person instruction. Although there are exceptions, the map suggests that institutions in red states are more likely to have returned to face-to-face instruction than colleges in blue states. Within the sample represented in the figure, only 36 percent of institutions located in Clinton-supporting states returned to the classroom. In contrast, about 60 percent of institutions located in Trump-supporting states returned to substantial in-person instruction.

Concentrations of Conservative Protestants

Early in the COVID-19 crisis, several news outlets reported that some leaders of conservative churches across the United States were downplaying the severity of the pandemic and were continuing to gather in person despite stay-at-home orders (Barria 2020; Kaleem 2020). Evangelicals' greater reluctance to heed warnings from public health authorities could have followed from Trump's example but could also have roots in the greater skepticism toward scientific institutions observed among some religious people (Evans 2013; Gauchat 2008; Hill, Gonzalez, and Burdette 2020). Areas with higher concentrations of Evangelicals may be more inclined to support norms that do not take COVID-19 as seriously as people in other parts of the

[1]Our study excludes specialized schools (e.g., Yeshivas, art schools, engineering schools, culinary schools), which were not as well represented in the sample from Davidson College, and those for which all classes were online for at least half of the student population prior to the pandemic.

[2]In fall 2018, 14% of undergraduates were enrolled in online classes exclusively. Another 20.5% were taking some of their classes online (US Department of Education 2019).

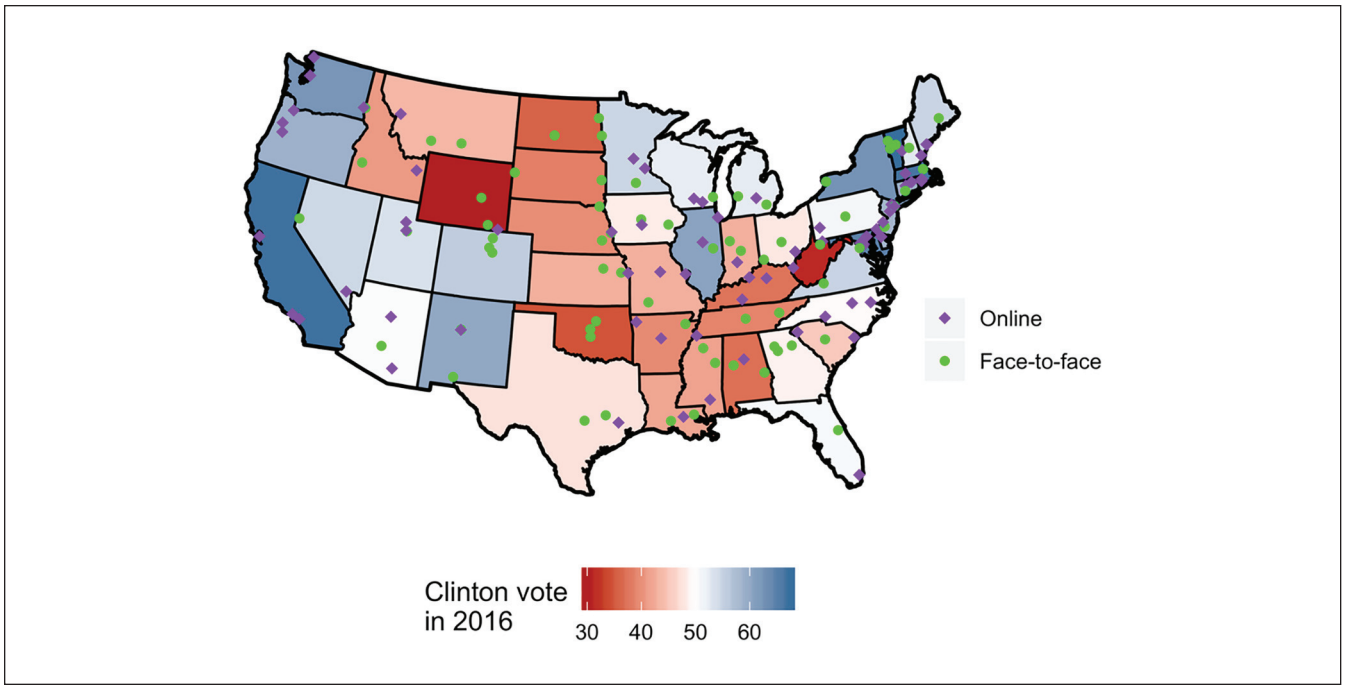

Figure 1. Instructional modality for the three largest colleges for each state and 2016 presidential election results by state.

country. The resulting sentiments may have impacted executives at local colleges.

Colleges' Economic Impact on the Surrounding Area

Colleges that make major contributions to the local economy may also be under greater pressure to provide in-person instruction (Sullivan 2020). In communities where colleges are relatively large compared with the local population, many retail businesses in the immediate vicinity are likely to be highly reliant on traffic generated from the school. They are also likely to employ local residents to work on campus (Gumprecht 2003). In deciding whether to allow in-person classes, colleges may have considered the economic and cultural impact of their decisions on their local communities, especially in places where they are major sources of revenue.

Local COVID-19 Infections and Fatalities

We would anticipate that college administrators in states and counties with higher cumulative incidence rates of COVID-19 infections and fatalities would be less likely to plan for in-person classes. The more proximate the suffering from the virus, the more tangible and concerning it would likely be for college leaders and the rest of the campus community. Thus, we would expect administrators in highly affected areas to have more personal, political, and financial reasons to remain remote in the fall. Administrators in such areas might have reasonably concluded that parents in communities ravaged by COVID-19 might not want their children returning to in-person instruction anyway, so the risk to enrollment of remaining online might be minimal. The political pressure to remain remote might have also been greater in areas where death rates were high. Such health considerations may also vary by population density to the extent that individuals encounter greater numbers of people in closer proximity in denser places, making it easier for the virus to spread. Additionally, during the spring wave of COVID-19, densely populated areas, like New York City, were disproportionately affected.

Institutional Characteristics

While local and state cultures, political climates, economics, and infection rates are likely to have a role in shaping reopening decisions, the characteristics of colleges themselves should have also had a major impact. Perhaps even more so than the larger community, from a bounded rationality perspective (Simon 1990), administrators had to decide what their colleges were capable of doing to open safely and what would be beyond their reach even as they did not know the full financial, political, and health-related costs COVID-19 would inflict. In our study we consider the role of four sets of college characteristics—financial health, faculty resistance, online readiness, and product niche—that could have shaped the odds that colleges offered in-person classes during the fall 2020 semester.

Product Niche

Brick-and-mortar colleges vary dramatically in the kinds of educational products they offer and in the extent to which remote learning provides a viable substitute. Two-year community colleges and lower cost four-year public schools offer commodity educational products that compete largely on price within their local markets. By contrast, higher cost four-year public and private schools compete less on cost and more on the quality of the educational goods they purport to provide (Sun 2020), including higher graduation rates (Deangelo et al. 2011). Students attending the highest cost private schools are paying for what amounts to an exclusive club: bespoke treatment, ample campus amenities, and access to networking opportunities (Holmstrom, Karp, and Gray 2011). This exclusive experience is of course highly dependent on face-to-face interaction.

The higher the tuition and greater the expense per student, the less distance learning is likely perceived as a viable substitute by students or administrators seeking to serve their institutional mission and keep students happy. And institutions offering high-priced degrees are limited in their ability to reduce prices and product offerings because of high fixed costs and concerns about maintaining their brand.

Schools that spend more per student may have also been more likely to plan for in-person instruction because they would sacrifice more than others by switching to online instruction. In particular, the networking benefits of a more expensive school are likely to have been attenuated significantly by keeping instruction remote.

We also expect that schools with larger proportions of students living on campus would have been more likely to reopen. In the United States, the residential college living experience is often seen as a rite of passage. Colleges generate a lot of revenue from having students live on campus, where they not only pay for rooms but also for meal plans and extracurricular activities (Lederman 2020). Likewise, colleges with higher proportions of students residing on campus will have students who expect the full residential college experience. For commuter students planning to attend college while living with parents or elsewhere off campus, online courses may appear more attractive as they make it easier to attend by possibly eliminating the commute (Castonguay 2020).

Faculty Resistance: Faculty Unions and Percentage Full Professor

We are unaware of any nationally representative survey of faculty preferences about reopening in the fall, so it is unclear whether the majority opposed returning to in-person teaching. However, media reporting suggests that instructional staff and faculty unions that were vocal on the subject tended to prefer online options (Hartocollis 2020; Zahneis 2020). Early decisions to remain online (e.g., at California State University) prompted no opposition. Meanwhile, vocal administrative support for returning to the classroom (e.g., Purdue University president Mitch Daniels) encountered faculty pushback (Flaherty 2020).

Age may play a role in these concerns, as older individuals are especially vulnerable to severe complications related to the coronavirus (CDC 2020b), and college faculty members tend to be older than the general working population. Faculty members' careers begin later and end later. Although just 23 percent of people in the general workforce are older than 55, 37 percent of faculty members are (McChesney and Bichsel 2020).

If we assume that faculty members are likely to favor online teaching for health reasons, we might surmise that administrators at universities at which faculty members hold more power would have been less likely to insist on face-to-face teaching. The power of faculty members in advocating for themselves is likely to be greater in cases in which (1) faculty unions are stronger, (2) there is a larger proportion of full-time relative to part-time faculty members, and (3) there is a higher percentage of faculty members at the highest rank of "full" professor.

Financial Health

According to media reports, many college students were wary of paying standard college tuition to attend exclusively online courses. Many students seemed to feel that the experience of in-person classes is far more compelling than what can be obtained virtually. College administrators knew that if they remained online, it was likely that significant numbers of students with these preferences would defer or transfer, prompting enrollment decline. The more financially vulnerable an institution, the less able it would be to weather the tuition loss, and thus the more likely administrators would be to pursue a return to the classroom. So we expect financial vulnerability to be positively related to in-person teaching. We measure various aspects of financial vulnerability with undergraduate enrollment, enrollment trend, level of dependence on tuition revenue, the extent to which revenues exceed costs (net revenue), endowment per student, and undergraduate enrollment.

It is also possible that financial well-being is related to an increased likelihood of in-person classes. For in-person instruction to occur, colleges needed to enact a range of safety measures (e.g., virus testing, personal protective equipment, temperature checks, ventilation systems), which can be costly (ACE 2020; CDC 2020a). Schools that were more financially secure (i.e., with higher net revenue and endowment per student) may have had the financial resources to open safely enough to convince students (and their parents) to return, thereby further increasing their financial security. Additionally, larger and more financially secure

colleges may be more likely to offer services, activities, and events, such as football games, that can provide a lot of revenue, further improving their financial position. Colleges in worse financial condition may be less likely to historically offer these revenue generating activities and hence would suffer less by moving most or all classes online.

Online Readiness

The final factor that we consider is the extent to which colleges were prepared for online teaching. Before COVID-19 shut down most in-person higher learning in March 2020, colleges varied substantially in the extent to which they were offering online classes. While about 20 percent of students at public schools had previously offered some online instruction, about 9 percent of nonprofit private schools had done so (Lederman 2018). The more that colleges offered online classes before the pandemic, the more skilled in providing remote learning they should be. Likewise, schools that are providing more virtual teaching should also be more likely to have student bodies that are familiar with and less averse to this alternative form of instruction.

In the next section, we explain how we assess which factors were most likely to shape the odds of having significant in-person instruction. One of the strengths of our study is that we are able to show which characteristics overlap and isolate those that have unique effects in explaining a college's decision to offer mostly in-person classes in fall 2020. Our analysis examines not only college characteristics but also the multilevel influences of the state and local political climate and cultural norms. As of this writing, this is the only peer-reviewed study[3] that we know of that comprehensively examines the factors that shaped reopening plans.

Data and Methods

We rely on data from Davidson College's (2020) College Crisis Initiative (CCI). We retrieved these data from the Chronicle of Higher Education (2020) website on October 22, 2020. Coverage of specialized institutions and tribal colleges in the CCI database was meager (23 percent), so we exclude those institutions from our analysis. Our analytic sample includes the vast majority of institutions with 2018 Carnegie classifications of associates' colleges (87 percent), associate/baccalaureate and baccalaureate colleges (81 percent), masters' institutions (91 percent), and doctoral universities (95 percent).

CCI classified fall 2020 instructional plans into one of five categories: fully online, primarily online, hybrid, primarily in person, and fully in person. Instruction plans at about 4% of institutions either could not be classified or could not be determined and are thus excluded from consideration here. We take the first two categories (i.e., fully online and primarily online) to be indicative of a more cautious approach of returning to classes. The latter three categories (i.e., hybrid, primarily in person, and fully in person), in contrast, indicate a decision to return substantial numbers of students and faculty members to the classroom in the face of considerable uncertainty about the associated risks.

Table 1 describes the data sources and coding. Table 2 presents descriptive statistics for all variables in the analysis prior to standardization. Most of our independent variables come from the Integrated Postsecondary Education Database System based at the National Center for Education Statistics. For most variables coding was straightforward, but some coding decisions require further explanation. Since tuition prices are collinear with sector (private/public), we measure tuition and fees in relative terms within sector. More specifically, tuition is as a dichotomous variable indicating whether it fell above the median for the state among public institutions and whether it fell above the median for the country among private institutions. The idea here is to gauge whether the institution is charging a premium in the market where it operates.

In addition to the variables presented in Table 1, in analyses not shown, we also examined the effects of ACT and SAT scores, Coronavirus Aid, Relief, and Economic Security (CARES) Act Higher Education Relief Fund allocation, average annual change in assets, and the percentage of first-time full-time students with Pell Grants. None of these variables had statistically significant effects. Table 2 presents descriptive statistics for all variables in the analysis prior to standardization.

We estimated hierarchical logistic regression models predicting whether college administrators had announced plans for significant classroom instruction in their institution for the fall 2020 semester. Our models include random effects for states, since administrator decision making is assumed to correlate within them. Within states, we found minimal evidence for spatial autocorrelation using Moran's I on the binary outcome measure. Moran's I statistics were largely nonsignificant and/or small in magnitude. The largest state spatial autocorrelations, which were for Colorado and Minnesota, were only .14 and .12, respectively. Visual inspection of maps of those states reveals no meaningful patterns, except perhaps in the case of Colorado, where decisions to remain online were concentrated in the more urban areas around Denver and Colorado Springs. Overall, our

[3]In early September 2020, *Inside Higher Ed* magazine noted that the College Crisis Initiative at Davidson College had conducted an analysis with anticipated reopening data, finding that the proportion of an area voting for Trump was associated with a greater likelihood of providing in-person instruction (St. Amour 2020). However, the magazine did not provide much additional information, such as the analytical techniques or additional variables and controls examined. These findings were based on reopening plans made prior to August 2020. We tried to obtain more information about the study but did not receive a response. A thorough literature search did not reveal any related articles.

Table 1. Description and Sources of Variables in the Analysis.

Category	Variable	Description	Source
Dependent variable	Significant in-person instruction for fall 2020 semester[a]	Hybrid, primarily in person, and fully in person = 1; primarily or fully online = 0 (as of October 22, 2020)	College Crisis Initiative, Davidson College
State politics	State percentage Evangelical	Estimated percentage of state residents belonging to Evangelical denominations	U.S. Religion Census (Grammich et al. 2019)
	No state mask mandate[a]	No state mask mandate imposed by August 1, 2020	COVID-19 U.S. State Policy Database (Raifman et al. 2020)
	State Trump vote percentage	Percentage of vote for Trump in state, 2016	MIT Election Data and Science Lab
County politics	County Trump vote percentage	Percentage who voted for Trump in county in 2016	MIT Election Data and Science Lab
	County percentage Evangelical	Estimated percentage of residents in county belonging to Evangelical denominations in 2010	U.S. Religion Census (Grammich et al. 2019)
	Importance to area economy[a]	Sum of full-time equivalent students and full-time instructional employees divided by county population	IPEDS, U.S. census
County health	County COVID-19 incidence rate by July 1, 2020 (logged)	Log of COVID-19 confirmed cases per 100,000 residents in county by July 1, 2020	COVID-19 Data Repository, CSSE at Johns Hopkins University
	County COVID case fatality rate	Log of COVID-19 confirmed deaths per case in county by July 1, 2020	
	County population density[a] (logged)	Log of the estimated number of people per square mile in county	U.S. Census Bureau
State health	State COVID-19 incidence rate (logged)	Log of confirmed COVID-19 cases per 100,000 residents in state by July 1, 2020	COVID-19 Data Repository, CSSE at Johns Hopkins University
	State COVID-19 case fatality rate	Log of confirmed COVID-19 deaths per case in state by July 1, 2020	
Financial health	Net revenue[a]	Net revenue as a percentage of total revenue	IPEDS
	Endowment per student (logged)	Log of endowment assets (year end) per full-time equivalent enrollment, 2018	IPEDS
	Enrollment trend[a]	Estimated from the random slope in a mixed model predicting logged full-time equivalent enrollment between 2011 and 2018	IPEDS
	Undergraduate enrollment (logged)	Count of full-time equivalent undergraduates	IPEDS
	Percentage of revenue from tuition	Tuition and fees as a percent of core revenues	IPEDS
Faculty resistance	Faculty union[a]	Coded 1 if Google search returned AFT or UUP Web site within the first five returns	Google searches
	Percentage full professors[a]	Percentage of instructional staff members with full professor title	IPEDS
	Percentage tenured[a]	Percentage of instructional staff members with tenure	
	Percentage full-time[a]	Percentage of instructional staff members who are full-time	
Online readiness	Percentage students all online	Percentage of students taking only online classes	IPEDS
	Percentage students with online classes	Percentage of students taking at least one online class	IPEDS
Product niche	Four-year public	School type (reference: two-year schools[b])	IPEDS
	Four-year private		IPEDS
	High tuition for sector[a]	Tuition above the median for the sector (public in the state/private overall)	IPEDS
	Expenses per student (logged)	Instructional expenses per full-time equivalent student	IPEDS
	Dorm capacity[a]	Dorm capacity divided by number of full-time equivalent undergrads	IPEDS
	Graduation rate	Graduation rate for first-time, full-time degree or certificate-seeking students, 2012 cohort	IPEDS

Note: AFT = American Federation of Teachers; COVID-19 = coronavirus disease 2019; CSSE = Center for Systems Science and Engineering; IPEDS = Integrated Postsecondary Education Database System; UUP = United University Professions.

[a]Variable was constructed by the authors on the basis of data from the source. All other variables were taken directly from the source.

[b]The vast majority of the two-year schools in the database were public (97.4 percent), and just a minority were private (2.6 percent). The database on school reopening from Davidson College included very few private (often for-profit) colleges.

Table 2. Descriptive Statistics for Unstandardized Versions of Variables Included in the Analysis.

	Mean	*SD*	Minimum	Maximum
Significant in-person instruction[a]	.52	.50	.00	1.00
State percentage evangelical	16.72	10.45	2.28	42.04
No state mask mandate	.22	.41	.00	1.00
State Trump vote (%)	47.56	9.68	4.12	70.05
County Trump vote (%)	48.10	17.39	4.12	87.04
County percentage Evangelical	17.57	13.16	.05	73.00
Importance to area economy	.27	1.52	−6.35	4.28
County COVID-19 incidence rate (logged)	6.19	1.02	1.96	9.07
County COVID-19 case fatality rate	.04	.03	.00	.25
County population density (logged)	5.89	1.73	.91	11.18
State COVID-19 incidence (logged)	5.85	1.02	2.88	8.11
State COVID-19 case fatality rate	.04	.02	.00	.09
Net revenue	.05	.14	−1.28	.79
Endowment per student (logged)	7.78	3.40	.00	14.93
Enrollment trend	−.01	.04	−.38	.48
Undergraduate enrollment (logged)	7.99	1.06	3.87	10.92
Revenue from tuition (%)	38.74	25.21	1.00	100.00
Faculty union	.31	.46	.00	1.00
Full professors (%)	21.42	17.71	.00	100.00
Tenured (%)	40.59	26.93	.00	98.92
Full-time (%)	49.20	19.92	4.81	99.29
Students all online (%)	11.02	10.62	.00	50.00
Students with online classes (%)	19.07	14.25	.00	100.00
Four-year public	.28	.45	.00	1.00
Four-year private	.37	.48	.00	1.00
Two-year schools (97% are public) (reference)	.35	.48	.00	1.00
High tuition for sector	.52	.50	.00	1.00
Expenses per student (logged)	8.99	.50	7.19	11.76
Dorm capacity	30.42	32.89	.00	100.00
Graduation rate	45.71	20.77	.00	100.00

Note: COVID-19 = coronavirus disease 2019.
[a]The dependent variable was coded 1 indicating significant in-person instruction if it had been classified by the Davidson College Crisis Initiative as offering hybrid, primarily in-person, or fully in-person in the fall. Institutions that were classified as providing fully or primarily online instruction were coded 0.

results indicate that decision making is largely unrelated to geographic proximity within states.

Our models also include random effects for systems of higher education within which 41 percent of institutions in our sample are subsumed. Because only a subset of institutions is located within systems of higher education, our data can be described as partially nested, which complicates modeling decisions. There is no canonical modeling strategy for partially nested data with binary outcomes. Research in this area has focused on evaluating methods for estimating the effects of treatments administered to individuals nested within clusters (e.g., classes, therapists) when individuals in the control group are not nested (Roberts, Batistatou, and Roberts 2016; Lohr, Schochet, and Sanders 2014). The methodological literature in the area is limited in its ability to inform our study in that we are not comparing outcomes between nested and non-nested cases.

In accordance with alternative strategies presented in the literature just cited, we estimate two sets of models. Both sets of models include a random intercept for state but differ in how they handle nesting within systems of higher education (e.g., California State, Pennsylvania State). One set of models also includes a random effect of a dummy variable indicating affiliation with a larger system that varies by system. The other set of models includes a random intercept varying by system, where unaffiliated colleges are all included in one pseudocluster.[4] Because the results of both

[4]Two additional alternatives were (1) treating unaffiliated institutions as their own clusters in a random-effects model and (2) generalized estimating equations. The former encountered singularity problems in estimation, and the latter was not equipped to handle the partially nested, cross-classified nature of these data in which one had to account for clustering within state and higher education systems.

sets of models are substantively similar, we present results from only the former.

In our models, we standardized all continuous (nondichotomous) independent variables to facilitate interpretation. We logged six continuous variables with absolute skewness values above 1.5, reasoning that nonlinear effects were generally more plausible in those cases. The logged variables were county and state COVID-19 incidence rates, county population density, endowment per student, undergraduate enrollment, and expenses per student.

Model building proceeds as follows. First, we estimate a model for each of the themes of factors we had reason to believe would influence the decision to return to face-to-face teaching. Then, we estimate a final model that includes all variables for which there were significant coefficients in the thematic models.

Results

Table 3 presents a correlation matrix for all variables that are correlated at $r > .5$ with at least one other variable. We have multiple measures of related concepts, and some of the correlations are quite high. The largest correlation is between county and state proportion Evangelical and is entered separately in our regression models. The next two largest, percentage of revenue from tuition and dorm capacity, each have a correlation with four-year private schools of .73. It is relatively rare for private schools to not have high dorm capacity or be dependent on tuition as a major revenue stream. The next three highest correlations are between state proportion voting for Trump and state COVID-19 incidence rates (.72), state percentage Evangelical and state COVID-19 incidence rate (.70), and county proportion voting for Trump and county population density (–.68). Despite relatively high correlations between variables in several models, we did not encounter identification problems. In our multivariate regression, we test each set of variables related to a given dimension (i.e., financial health) of the decision-making process separately. If any of these variables are significant, we then include them in our final model.

In Table 4 we present the bivariate relationships between each predictor and the outcome using hierarchical logistic regression models. We also provide pseudo-R^2 statistics to offer insight into how much variation each variable explains on its own. At least one variable was significantly associated with returning to in-person classes for all categories except online readiness. We see that the factors explaining the largest variation in returning to in-person instruction are dorm capacity, undergraduate enrollment, and county vote percentage for Trump.

Moving now to Table 5, the first model examines state politics and the religious environment. Whereas mask mandates and proportion Evangelical are not significant, the proportion voting for Trump is. A 1 standard deviation increase in the percentage voting for Trump is associated with almost double the odds that schools provided mostly in-person instruction. In the second model (county politics), the only significant variable is the county percentage voting for Trump, which has a standardized coefficient that is slightly smaller (1.63) than the state percentage voting for Trump (1.98).

In model 3 we include the county health variables, and surprisingly neither COVID-19 incidence nor case fatality rates are significant. However, as expected, increases in the county population density are associated with a decrease in the odds that classes would reopen mostly in person. Model 4 focuses on state health-related variables. Here the state logged COVID-19 incidence rate is associated with an increase in the odds that schools return to significant in-person instruction. At this point in the analysis, none of the pseudo-R^2 values are particularly large, and clearly many other factors that we are unable to anticipate or measure are important for reopening decisions.

Moving to Table 6, the first model focuses on the financial health variables. Three of them, endowment per student, undergraduate enrollment, and the percentage of revenue from tuition, are significant. A 1 standard deviation increase in the logged endowment per student is associated with a 32 percent increase in the odds of having significant in-person instruction. A 1 standard deviation increase in the percentage of revenue from tuition is associated with a 45 percent increase in opening mostly in person.

The second model includes variables that assess faculty resistance to opening. Without controlling for anything aside from these four variables, colleges with faculty unions and higher percentages of tenured professors appear less likely to open in person. Conversely, the percentage of full-time faculty members is associated with an increase in the odds of mostly in-person instruction.

Model 3 in Table 6 focuses on online readiness, and neither of the variables included is significantly associated with the likelihood of opening in person. The fourth model focuses on product niche. Dorm capacity and graduation rates are associated with increases in the odds of having significant in-person instruction. Conversely, expenses per student are inversely related to opening mostly in-person. At this point, four-year private colleges are significantly more likely than two-year schools to provide substantial on-campus teaching.

Model 5 includes all of the statistically significant coefficients from previous models, providing insight into which variables remain significant in the midst of the others. Note once again that all independent variables in the models shown in Tables 5 and 6 have been standardized so their effect sizes can be compared.

Model 5 shows that a 1 standard deviation increase in logged undergrad enrollment is associated with a 24 percent decrease in the odds of providing mostly in-person instruction. The percentage revenue from tuition is also significant

Table 3. Correlation Matrix[a] for All Independent Variables with at Least One Intercorrelation Above 0.5.

	1. State Percentage Evangelical	2. State Trump Vote Percentage	3. County Trump Vote Percentage	4. County Percentage Evangelical	5. Import to Area Economy	6. State COVID-19 Incidence	7. State COVID-19 CFR	8. County COVID-19 Incidence	9. County COVID-19 CFR	10. County Population Density	11. Endowment per Student	12. Percentage Revenue Tuition	13. Percentage Full-Time	14. Four-Year Private	15. Expenses per Student	16. Dorm Capacity
2	.7															
3	.35	.52														
4	.82	.57	.51													
5	.24	.33	.46	.27												
6	.65	.72	.36	.53	.4											
7	−.43	−.26	−.15	−.37	−.08	−.2										
8	−.06	−.16	−.42	−.14	−.33	.03	.25									
9	−.33	−.22	−.23	−.29	−.17	−.16	.59	.28								
10	−.23	−.34	−.68	−.3	−.59	−.32	.27	.54	.3							
11	−.06	.05	.01	−.05	.11	.07	.13	.01	.08	.02						
12	−.11	.02	−.06	−.11	−.24	−.01	.21	.1	.17	.21	.39					
13	.16	.18	.05	.11	.3	.19	−.06	−.1	−.1	−.13	.43	.04				
14	−.06	−.02	−.1	−.05	−.32	−.02	.12	.1	.1	.2	.52	.73	.15			
15	−.24	−.23	−.3	−.26	−.01	−.15	.2	.11	.14	.21	.51	.11	.5	.35		
16	−.03	.02	−.02	−.04	−.05	.04	.14	−.02	.06	.03	.62	.49	.51	.73	.52	
17[b]	−.2	−.13	−.16	−.2	.04	−.09	.14	.05	.08	.16	.58	.4	.54	.52	.66	.64

Note: CFR = case fatality rate; COVID-19 = coronavirus disease 2019.

[a]Given as sample size of 2,283, all correlations greater than 0.04 would be considered statistically significant at $p<0.05$.

[b]Variable 17 is graduation rate.

Table 4. Bivariate Relationship and Hierarchical Logistic Regression Analysis for Each Predictor Entered Separately.

	Bivariate Relationship[a]		Hierarchical Logistic Regression	
	Online	In Person	β Coefficient[b]	Pseudo-R^2
State politics				
State percentage Evangelical	.151	−.164	1.35*	.002
No state mask mandate	.288	.147	2.06*	.002
State Trump vote percentage	.282	−.308	1.81***	.011
County politics				
County Trump vote percentage	.26	−.283	1.63***	.025
County percentage Evangelical	.17	−.185	1.44***	.008
Importance to area economy	.141	−.154	1.12*	.001
State health				
State COVID-19 incidence rate	.252	−.274	1.75***	.007
State COVID-19 case fatality rate	.004	−.005	.79+	.001
County health				
County COVID-19 incidence rate	−.093	.102	.75***	.009
County COVID-19 case fatality rate	−.058	.063	.85**	.003
County population density	−.188	.205	.65***	.02
Financial health				
Net revenue	.009	−.01	.89*	.002
Endowment per student	.211	−.23	1.4***	.01
Enrollment trend	.005	−.006	.99	0
Undergrad enrollment	−.224	.244	.62***	.027
Percentage of revenue from tuition	.242	−.264	1.62***	.023
Faculty resistance				
Faculty union	.243	.377	.75*	.002
Percentage full professors	.059	−.065	1.08	.001
Percentage tenured	−.114	.125	.88*	.002
Percentage full-time	.168	−.184	1.25***	.006
Online readiness				
Percentage students all online	.004	−.004	.99	0
Percentage students with online classes	−.025	.027	.94	0
Market niche				
Four-year public	.279	.285	.83	.001
Four-year private	.477	.249	2.75***	.024
High tuition for sector	.044	−.048	1.08	.001
Expenses per student	.021	−.023	1	0
Dorm capacity	.259	−.282	1.72***	.031
Graduation rate	.144	−.157	1.35***	.01

Note: All measures are standardized; β coefficients are exponentiated. COVID-19 = coronavirus disease 2019.
[a]Averages of independent variables by the dependent variable.
[b]Asterisks indicate that the independent variable was a significant predictor of substantial in-person instruction in a model with random effects for state and higher education system.
$^{+}p < .10$. $^{*}p < .05$. $^{**}p < .01$. $^{***}p < .005$.

and associated with a 60 percent increase in the odds of significant in-person instruction. None of the faculty resistance variables remain significant. Among the product niche variables, dorm capacity and graduation rates are significant and substantial in size.

Among the county- and state-level factors that were significant in Table 5, three of the four variables remain significant in Table 6 and in the expected direction. As the proportion voting for Trump at the state and county levels increase, the odds of providing mostly in-person instruction also increases. Conversely, a 1 standard deviation increase in population density is associated with a 16 percent decrease in the odds of opening for in-person instruction. As would be expected, Model 5 of Table 6 is the best-fitting model as it has the highest pseudo-R^2 and lowest Brier score.

Using data from the significant variables found in model 5 in Table 6, Figure 2 presents the predicted probabilities of returning to substantial in-person instruction in fall 2020. The gray bars indicate the predicted values for estimates

Table 5. Hierarchical (Two-Level) Logistic Models Examining Whether College Had Significant In-Person Instruction[a] in the Fall 2020 Semester.

	State Politics	County Politics	County Health	State Health
	(1)	(2)	(3)	(4)
State percentage Evangelical	.85			
No state mask mandate	1.10			
State Trump vote percentage	1.98***			
County Trump vote percentage		1.63***		
County percentage Evangelical		1.11		
Importance to area economy		.91		
County COVID-19 incidence rate (logged)			.93	
County COVID-19 case fatality rate			.92	
County population density (logged)			.68***	
State COVID-19 incidence rate (logged)				1.71***
State COVID-19 case fatality rate				.91
Constant	1.45**	1.65***	1.57***	1.44**
State error *SD*	.51	.66	.76	.63
System error *SD*	1.64	1.68	1.65	1.61
Pseudo-R^2	.034	.049	.043	.029
Brier score	.182	.176	.177	.182
Observations	2,283	2,283	2,283	2,283
Log likelihood	−1,358.03	−1,337.01	−1,344.64	−1,364.34
Bayesian information criterion	2,762.45	2,720.42	2,735.68	2,767.34

Note: All measures are standardized, and exponentiated coefficients are presented. COVID-19 = coronavirus disease 2019.
[a]The dependent variable was coded 1, indicating significant in-person instruction, if it was classified by the College Crisis Initiative of Davidson College as offering hybrid, primarily in-person, or fully in-person instruction in fall 2020. Institutions that were classified as providing fully or primarily online instruction were coded 0.
**$p < .01$. ***$p < .001$.

Table 6. Hierarchical (Two-Level) Logistic Models Examining Whether College Had Significant In-Person Instruction[a] in the Fall 2020 Semester.

	Financial Health	Faculty Resistance	Online Readiness	Product Niche	All Significant
	(1)	(2)	(3)	(4)	(5)
Endowment per student (logged)	1.32***				1.07
Undergrad enrollment (logged)	.66***				.76***
Revenue from tuition percentage	1.45***				1.60***
Net revenue	1.01				
Enrollment trend	.97				
Faculty union		.75*			.99
Full professors percentage		1.10			
Tenured percentage		.82**			.92
Full-time percentage		1.30***			1.07
Students all online percentage			1.01		
Students with online classes percentage			.94		
Four-year public (reference: two-year colleges)				1.20	
Four-year private				1.60*	.67
High tuition for sector				1.02	
Expenses per student (logged)				.67***	.92
Dorm capacity				1.64***	1.41**
Graduation rate				1.19*	1.23*
State Trump vote percentage					1.41*

(continued)

Table 6. (continued)

	Financial Health	Faculty Resistance	Online Readiness	Product Niche	All Significant
	(1)	(2)	(3)	(4)	(5)
County Trump vote percentage					1.33***
County population density (logged)					.84*
State COVID-19 incidence (logged)					1.22
Constant	1.29^{+}	1.66***	1.62***	1.11	1.32^{+}
State error *SD*	.84	.77	.82	.83	.49
System error *SD*	1.33	1.56	1.65	1.34	1.21
Pseudo-R^2	.071	.035	.023	.066	.113
Brier score	.172	.180	.181	.172	.166
Observations	2,283	2,283	2,283	2,283	2,283
Log likelihood	−1,305.75	−1,356.16	−1,373.06	−1,312.71	−1,246.53
Bayesian information criterion	2,673.36	2,766.44	2,784.79	2,695.02	2,624.52

Note: All measures are standardized, and exponentiated coefficients are presented. COVID-19 = coronavirus disease 2019.
[a]The dependent variable was coded 1, indicating significant in-person instruction, if it was classified by the College Crisis Initiative of Davidson College as offering hybrid, primarily in-person, or fully in-person instruction in fall 2020. Institutions that were classified as providing fully or primarily online instruction were coded 0.
$^{+}p < .01$. $*p < .05$. $**p < .01$. $***p < .001$.

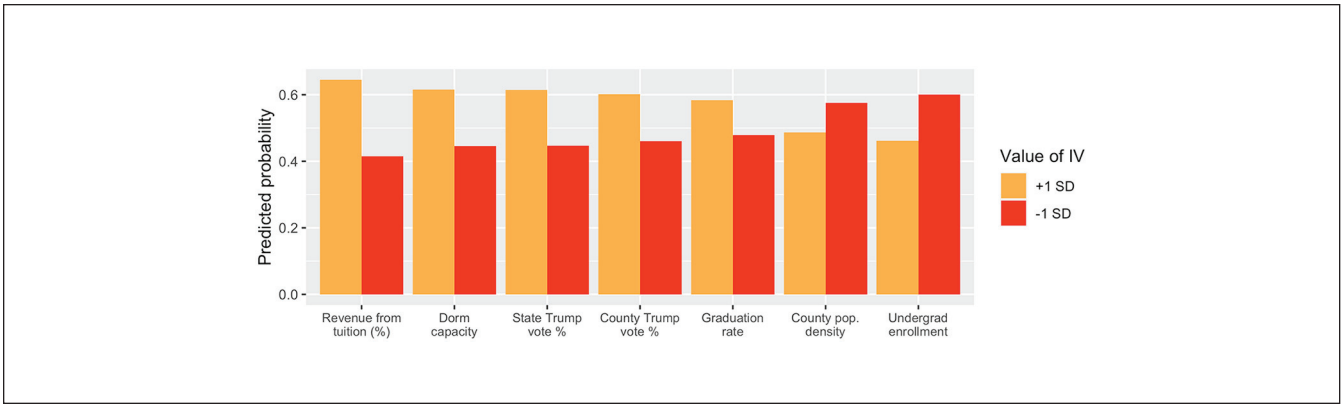

Figure 2. Predicted probabilities of returning to significant in-person teaching by values of the 7 variables with statistically significant effects in the final model (Table 6, Model 5). Light orange bars indicate predicted probabilities when the independent variable is 1 standard deviation above its mean. Red bars indicate predicted probabilities when the independent variable is 1 standard deviation below its mean. All other variables are held at their means.

that are 1 standard deviation below the mean. The combination of gray and orange bars presents the values for 1 standard deviation above the mean. The orange bar is the difference between the two (i.e., 1 *SD* above – 1 *SD* below), providing insight into the magnitude of the differences among the variables that are statistically significant. The percentage of revenue from tuition has the largest effect size. An institution that is 1 standard deviation above the mean on that variable has a predicted probability of .65 of offering in-person instruction. The next largest effects are state percentage voting for Trump and dorm capacity. Although both the state and county percentages voting for Trump have unique effects, the state-level influence appears to be slightly larger. Undergraduate enrollment has a moderate negative effect. The two smallest statistically significant effect sizes are for graduation rates and county population density. We discuss our findings in the final section.

Discussion and Conclusion

This study focused on identifying the key predictors of college administrators' decisions to return to in-person instruction during the fall 2020 semester. From a bounded

rationality perspective (Simon 1990), administrators had to decide whether to reopen with mostly in-person instruction within the limits of what could be known about COVID-19 and its financial, health, political, and cultural implications. We examined a number of different factors that could have affected their decisions. We were surprised to find that the proportion of COVID-19 cases, deaths, and mask mandates had no association with colleges' decisions to open their campuses. Rather, reopening decisions were driven largely by state and county politics as well as by budgetary concerns.

In our study we investigated a wide range of different variables related to product niche and the financial health of institutions, which included college type, tuition, expenses per student, dorm capacity, and graduation rates. Many of these variables were highly correlated. For example, the majority of four-year private schools have high dorm capacity and graduation rates and higher proportions of revenue coming from tuition (see correlations in Table 3). When entered together in our multivariate models, differences across school type (i.e., public vs. private) disappeared. However, other characteristics that are often associated with more elite institutions (i.e., dorm capacity and graduation rates) remained, explaining unique variation in the decision to provide mostly in-person instruction.

Many colleges had to seriously consider the extent to which students would be willing to enroll if they could not offer the bespoke experience many have come to expect at more expensive four-year institutions (Sun 2020). Some of the most elite colleges, including Harvard and Princeton, announced before August 2020 that they would not be offering in-person instruction. However, other schools could not be as confident that students would still attend or that they could weather the financial hardship if substantial numbers did not enroll.

Although the percentage of revenue coming from college tuition was a significant and positive factor, ultimately high tuition for the sector (i.e., private vs. public) and net revenue were not. For public colleges tuition is typically one of the top three most important sources of revenue and for many private schools it is the most important source (Startz 2020). For colleges for which tuition was the primary source of revenue, administrators may have anticipated the dire financial situation they would have encountered with fewer tuition-paying students. Conversely, colleges that were not so reliant on tuition revenue were better equipped to weather a semester or two of reduced enrollment.

One factor that was significant but in the opposite direction of what we anticipated was undergraduate enrollment. Colleges with larger undergraduate enrollments were less likely to offer significant in-person instruction in fall 2020 than those with smaller student populations. We had anticipated that colleges with larger student populations would have experienced greater pressure to provide in-person instruction because they are likely to offer a greater diversity of classes and course expectations. Additionally, by allowing for some hybrid classes, which we coded as part of our mostly in-person instruction outcome, colleges would have had more flexibility in allowing some classes to be online.

One reason colleges with larger undergraduate enrollments had lower odds of opening with mostly in-person instruction may be related to the logistical challenges in creating safe environments for large student bodies to interact during the COVID-19 era. Colleges that wanted to reopen for in-person instruction had to enact a range of safety measures (e.g., virus testing, personal protective equipment, temperature checks, ventilation systems, social distancing in classrooms), which would have been costly and especially challenging for large schools (ACE 2020; CDC 2020a). Colleges with large undergraduate enrollments likely have larger in-person classes, with some having hundreds of students. In these brick-and-mortar classrooms, in-person instruction with six feet of social distancing between each student may have been logistically impossible. Additionally, administrators may have also felt that students and their parents would be more hesitant about attending in-person classes with very large student populations because of safety concerns.

Although we were able to identify several substantial predictors, many expected associations were negligible. Neither faculty preferences nor online readiness were ultimately associated with reopening decisions in a multivariate context. For explaining unique variation in opening decisions, money and politics seemed to matter more than anything else, with the proportion who voted for Trump having effects at both the county and state levels.

Our study provides an "aerial view" of the subject matter. We did not talk with college administrators about their decision-making process and whether they considered, for example, the extent to which the surrounding area supported Trump's election. One strength of our study is that they too may not have realized the role that such factors as state politics ultimately played. At the same time, there may have been other forces not examined here that had an important influence. Future research might consider conducting interviews to get a better sense of administrators' perspectives.

We assessed a wide range of characteristics. To the best of our ability we used the most reliable measures we could find for measuring various concepts. But we did not always have a perfect match. For example, we thought that colleges with older faculty populations would advocate more for online classes, but we did not have a measure of average faculty age. Rather we relied on the college's proportion of faculty

members at the rank of full professor, which assesses the potential power of more senior faculty members, but only inadvertently considers age.

Our study was focused on final reopening decisions as of October 22, 2020. At that time the vast majority of colleges had made decisions. They may have been affected by emergency decisions that other colleges were making in August or September to move temporarily or permanently online because of large numbers of on-campus COVID-19 cases (Burke 2020). Indeed, several reports suggested that college reopenings were playing a role in keeping U.S. COVID-19 rates high (Korn and Abbott 2020; Hubler 2020).

The Davidson College CCI also has data on colleges' intentions to open as of August 1, 2020, before the fall 2020 semester had begun. In a separate analysis, we ran our analysis using these data and found much overlap with the results presented here. Similar to the present analysis, the proportion of state residents who voted for Trump was the most important factor in predicting whether colleges would reopen for substantial in-person instruction. Using the anticipated reopening data as of August 1, 2020, we also found that the proportion voting for Trump had a greater effect on four-year public colleges than private ones. The public institutions in our sample received an average of about 39 percent of their core revenue from their state governments. For this reason, colleges located in places with stronger pro-Trump orientations may have been under particularly strong pressure to report that they were going to reopen with substantial in-person instruction or to delay making an official decision, even in light of COVID-19 infection rates and deaths (Desrochers and Hurlburt 2016). In the present analysis, we no longer find this difference. Political and cultural pressure related to greater county and state support for Trump shaped reopening decisions regardless of college type. Hence, even private colleges were affected by the sentiments and political pressures emulating in more pro-Trump geographical areas.

COVID-19 dramatically raised the stakes of decision making by compelling colleges to engage in a cost-benefit analysis weighing the risks to health of individuals with that of their institutions. The severity of the local experience with COVID-19 appears to have played no role in these decisions. Although we examined reopening decisions as of October 22, 2020, many colleges announced their plans to provide almost all online instruction much earlier (Whitford 2020). In making their reopening plans, college administrators may have ascertained that the risks for new infections at the time of anticipated school reopening in August or September would be unrelated to cumulative infections in July 2020, when many reopening decisions were made. Perhaps this null result points as well to the fact COVID-19 had spread sufficiently by midsummer that the risk for infection was perceived as having roughly the same order of magnitude nationwide, at least on college campuses.

Although college executives certainly considered many of the factors examined here, we likely captured some unanticipated pressures that were not consciously considered, suggesting that the decision-making process may be less bounded by rationality than anticipated (i.e., Simon 1990). Given that the pandemic is likely to continue wreaking havoc for the foreseeable future, many colleges will have to make more key opening decisions. Some of the dynamics in our study are likely to operate in future decision making, as well as what colleges previously decided and what they observed at other institutions.

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